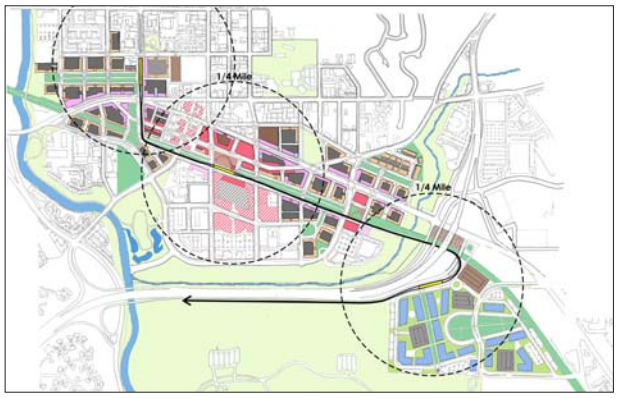
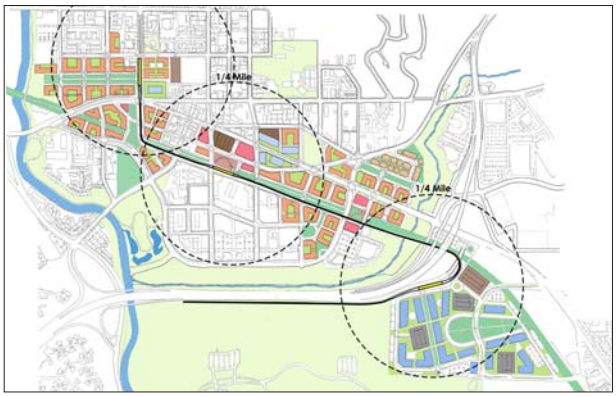
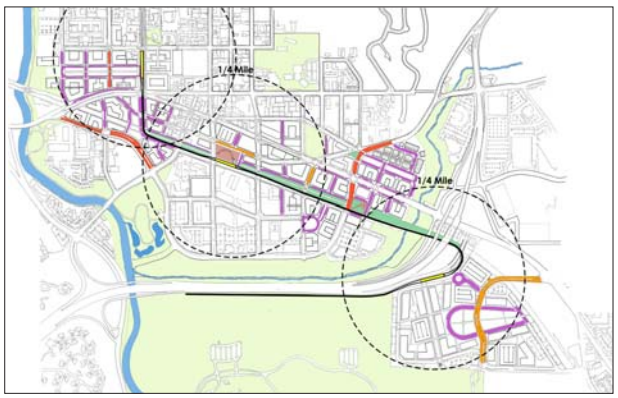






Redmond Downtown High Capacity Transit

Preferred Alignment Summary Report

Crandall Arambula PC

January, 2006

Study Participants

City of Redmond

Washington Department of Transportation

Sound Transit

Crandall Arambula, PC- Lead Consultant

URS

Urban Advisors, LTD

Table of Contents

Study Intent

This study is intended to provide decision makers and staff sufficient information to make recommendations for further high capacity transit (HCT) and land-use analysis and refinement for downtown and southeast Redmond.

The study does not provide specific recommendations for HCT technology; rather, it is "technologically neutral." That is, it can accommodate any of a variety of high capacity transit technologies. The study identifies an alignment and station areas that:

- Provide the most cost-effective route to downtown Redmond
- Minimize environmental impacts
- Provide the greatest opportunity for transit-oriented development, thereby, increasing potential HCT ridership
- Support and reinforce the City's vision for future growth
- Provide adequate analysis and detail for key components that can be used for future HCT studies by Sound Transit, WSDOT, PSRC and others

Why This Plan was Prepared

The City of Redmond, with the cooperation of other agencies, including Sound Transit, WSDOT and King County Metro, has developed this study to identify the potential for high-capacity transit (HCT) in downtown Redmond.

This study helps inform decision makers on a number of issues, including:

Sound Transit Phase 2 Planning

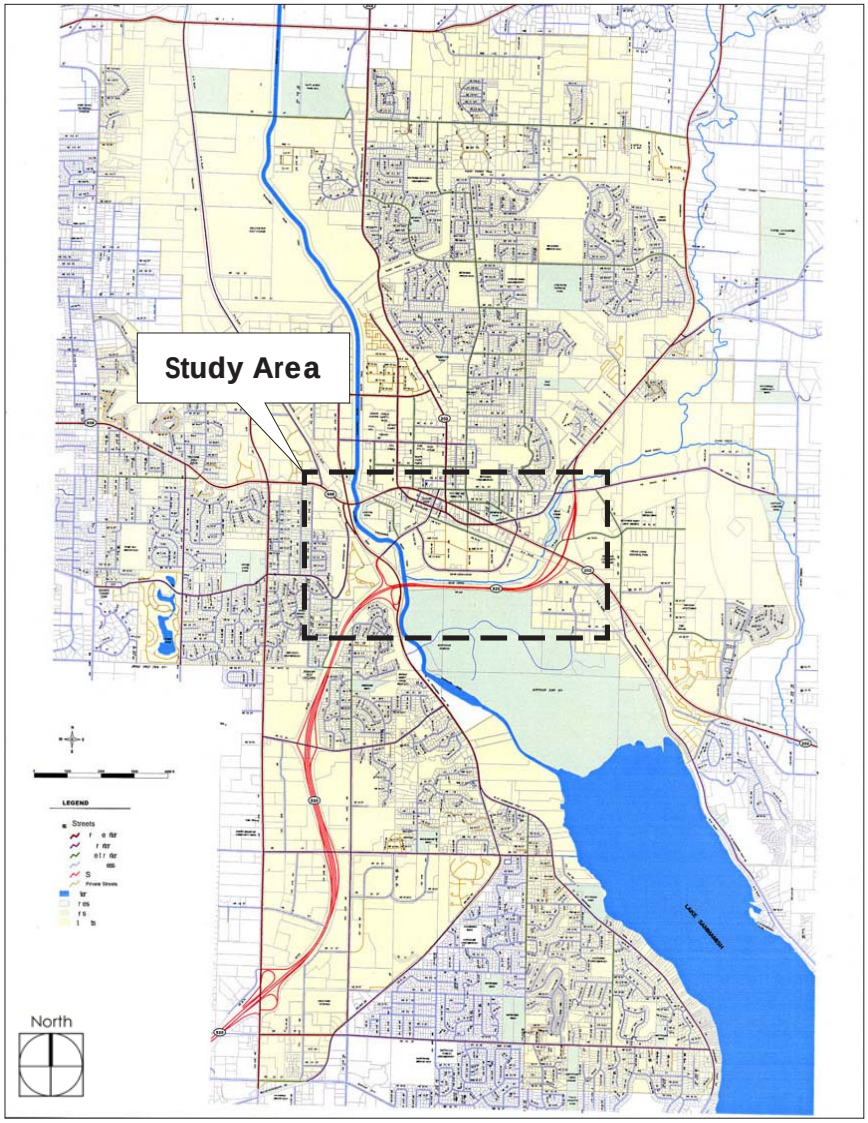
- Alignment, stations and park-and-ride facilities
- HCT technology (rail or rail convertible, bus, rapid transit)

WSDOT 520 "Nickel" Project

- Right-of-way impacts
- Road, bridge, environmental and interchange impacts

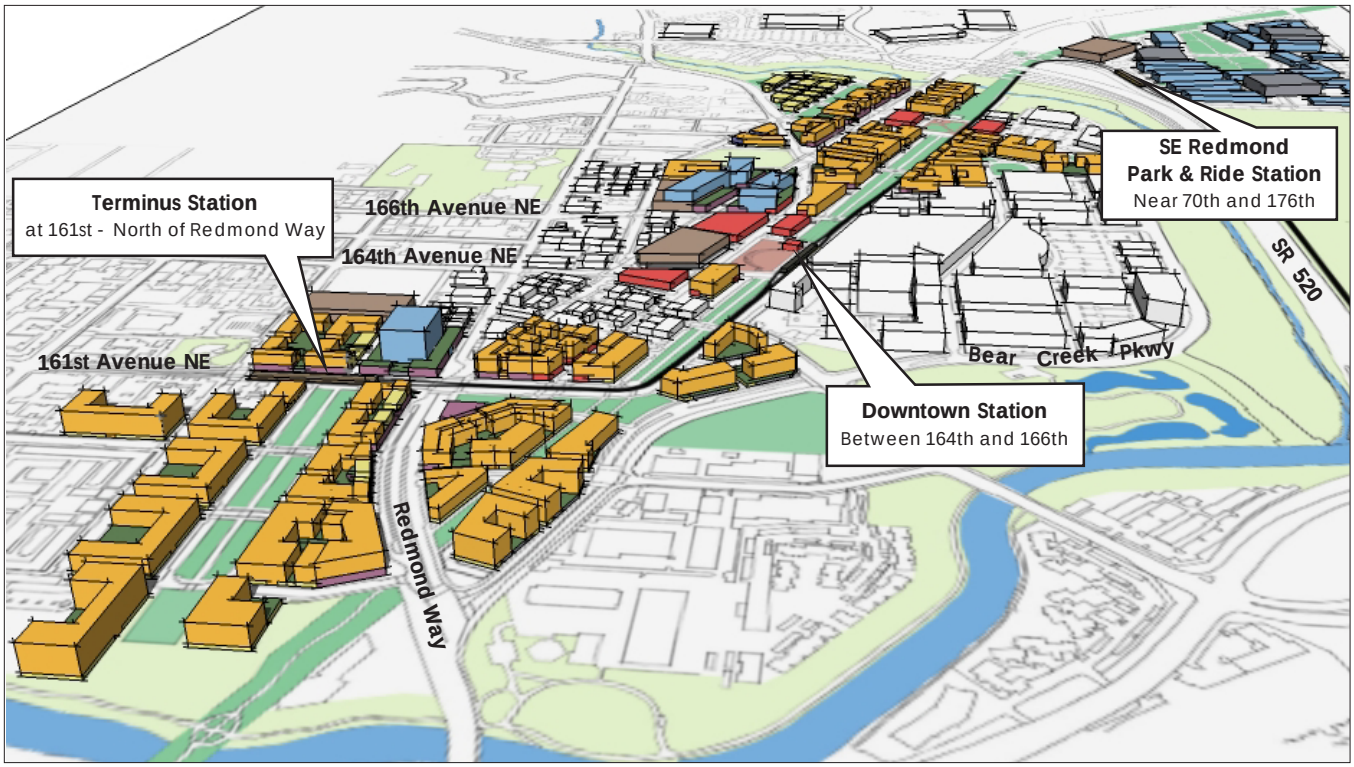
Redmond Vision for Downtown Growth

- Identify potential Comprehensive Plan updates.
- Provide further analysis and refinement of recommendations included in the Comprehensive Plan and Transportation Master Plan.



Study Area Context

Existing Downtown Redmond View to East



Redmond Downtown HCT Preferred Alignment Looking East

Study Overview

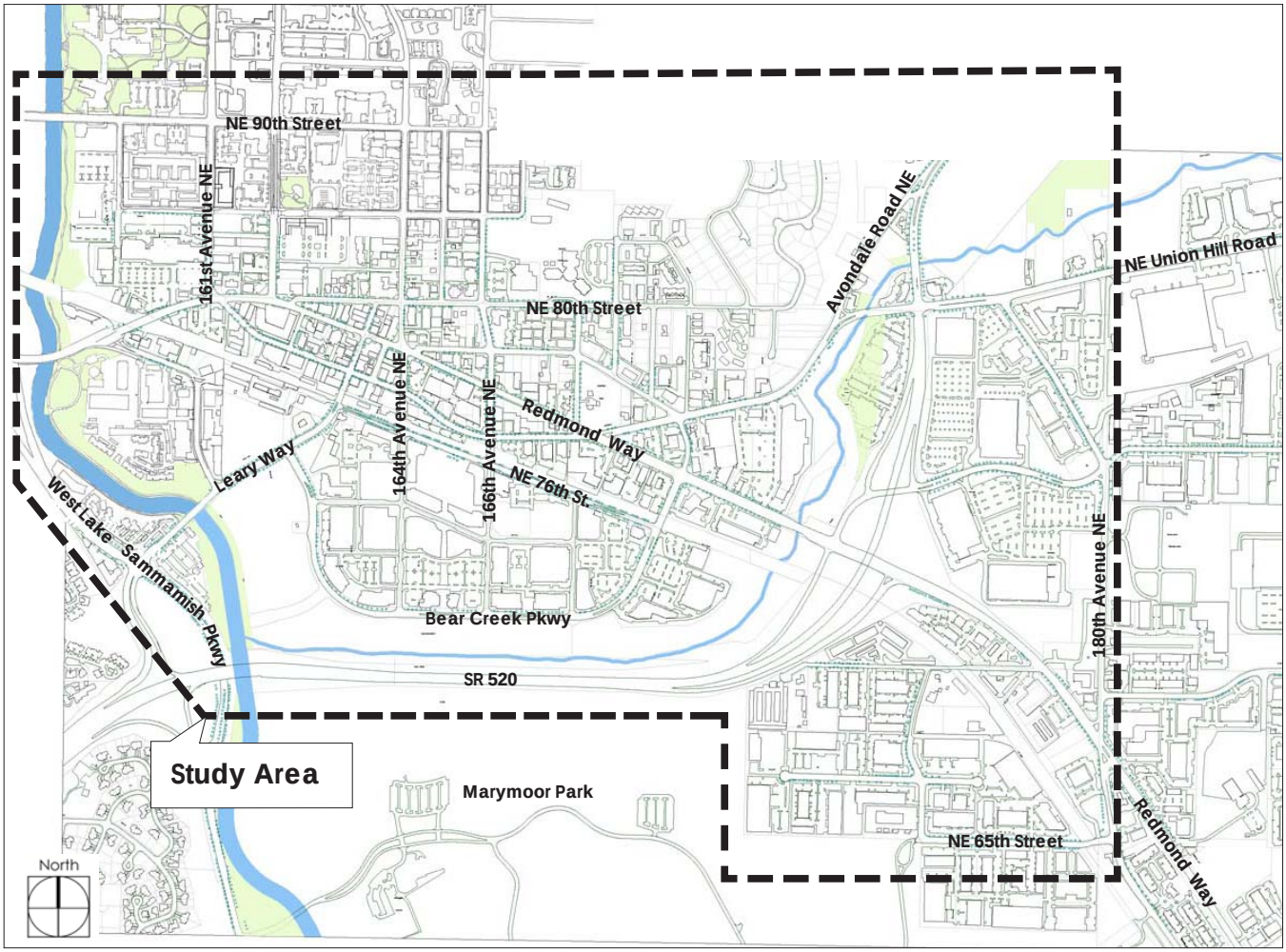
The consultant team, led by Crandall Arambula, worked with the City of Redmond, WSDOT, Sound Transit and other individuals recommended by the City to establish the study area, review background materials and inventory resources and existing conditions.

Study Area

The geographic boundaries of the planning areas were identified, refined and mapped. The agreed upon study area included NE 65th St. and Marymoor Park to the south, 180th Ave. NE to the east, NE 90th to the north and West Lake Sammamish Pkwy to the west.

Resources and Existing Conditions

The City's and state's mapping and data information was supplemented with field review as needed to analyze existing economic, market, transportation and infrastructure conditions.



Study Area Map

Study Process and Schedule

The study was initiated in January 2005 and concluded in October 2005. Key work tasks included:

Design Summit
(April 26, 2005)

An interactive education and work session attended by approximately 30 professionals representing City staff, neighboring jurisdictions, regional transit experts and stakeholders in which:

- Background information was reviewed.
- Alternative HCT technologies were discussed.
- Alternative HCT corridors were analyzed and evaluated (alternatives are shown on the following three pages).
- Preferred alignment(s) were selected (see next page).

Planning Commission Briefing
(May 18, 2005)

Staff presented to planning commission:

- The three alignment concepts being analyzed.
- The results of the Design Summit.
- Next steps in the study.

City Council Briefing
(June 21, 2005)

Staff presented to City Council:

- The three alignment concepts being analyzed.
- The results of the Design Summit.
- SR 520 alignment as the preliminary preferred.
- Key issues to be analyzed regarding the SR 520 alignment.
- Next steps.

Brainstorming Session
(August 8, 2005)

City, WSDOT and King County Metro staff worked with the consultants team to :

- Analyze key issues that resulted from the design summit.
- Identify refinement tasks for the preferred alignment.

Work Session
(September 21, 2005)

The preferred HCT alignment and transit-oriented development concepts were reviewed. The session was attended by City and King County Metro staff as well as WSDOT representatives. It included analysis and evaluation of:

- SR 520 HCT alignment and station platform location options
- Rail alignment and park-and-ride alternatives
- Transit stations
- Transit-oriented development concepts

Sound Transit Briefings
(September 28 & October 4, 2005)

City staff reviewed alternatives and preferred concepts with Sound Transit staff.

Design Summit Work Session

Alternative Alignments

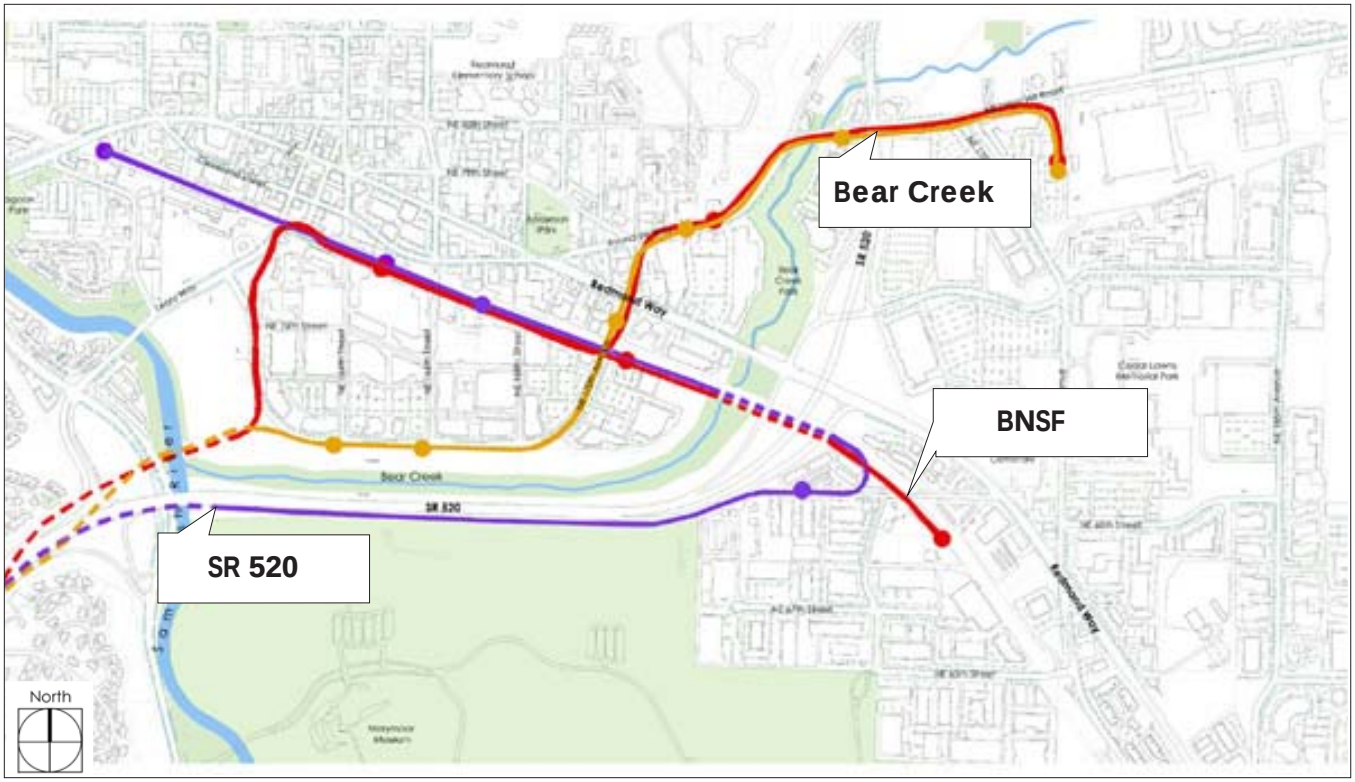
Three alignments were analyzed and a preferred alternative was selected by participants of the Design Summit on April 26, 2005. The alignments analyzed were:

- SR 520
- Bear Creek
- BNSF

Criteria for alignment selection included:

- TOD supportive criteria checklist.
- Comparative cost analysis.
- Potential development acreage.
- Consistency with adopted policies and plan.

The SR 520 alignment was selected as the preferred alternative and is further detailed on page 8 of this document. A brief discussion of the alignments that were not selected are on the following pages.



Alternative Alignments

Bear Creek Alignment

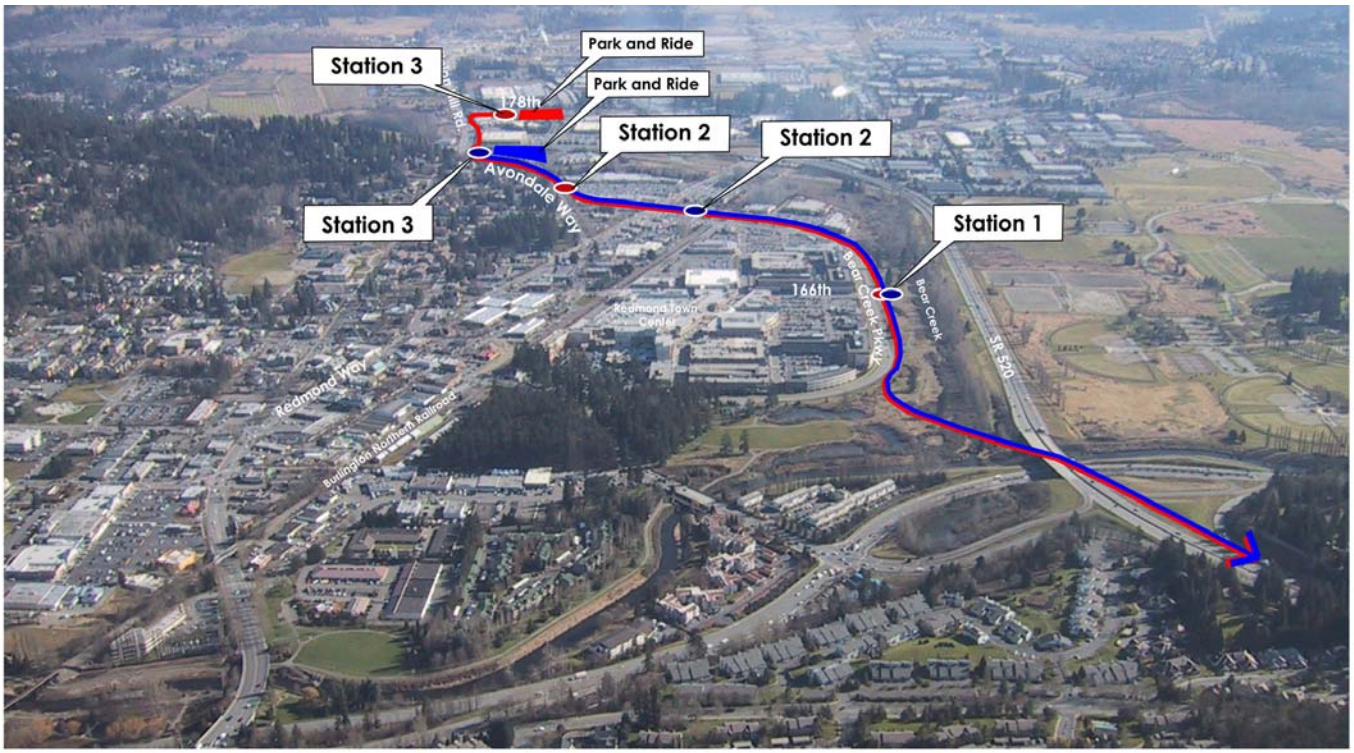
This alignment was not selected due to the following key considerations.

The park and ride was evaluated poorly because:

- Travel times would be greater (more stops) than the SR 520 alignment option.
- Access to the park and ride from major roadways was not as good as the SR 520 park and ride option.

The potential for transit-oriented development was less because:

- Stations had poorer access to existing transit supportive uses such as the Redmond Town Center ,
- Fewer redevelopable parcels were available near the stations (98 acres to 117 acres).



Bear Creek Alignment

BNSF Alignment

This alignment was not selected due to the following key constraints.

The park and ride was evaluated poorly because:

- Travel times would be greater (more stops in the downtown) than the SR 520 alignment.

Environmental impacts would be greater because:

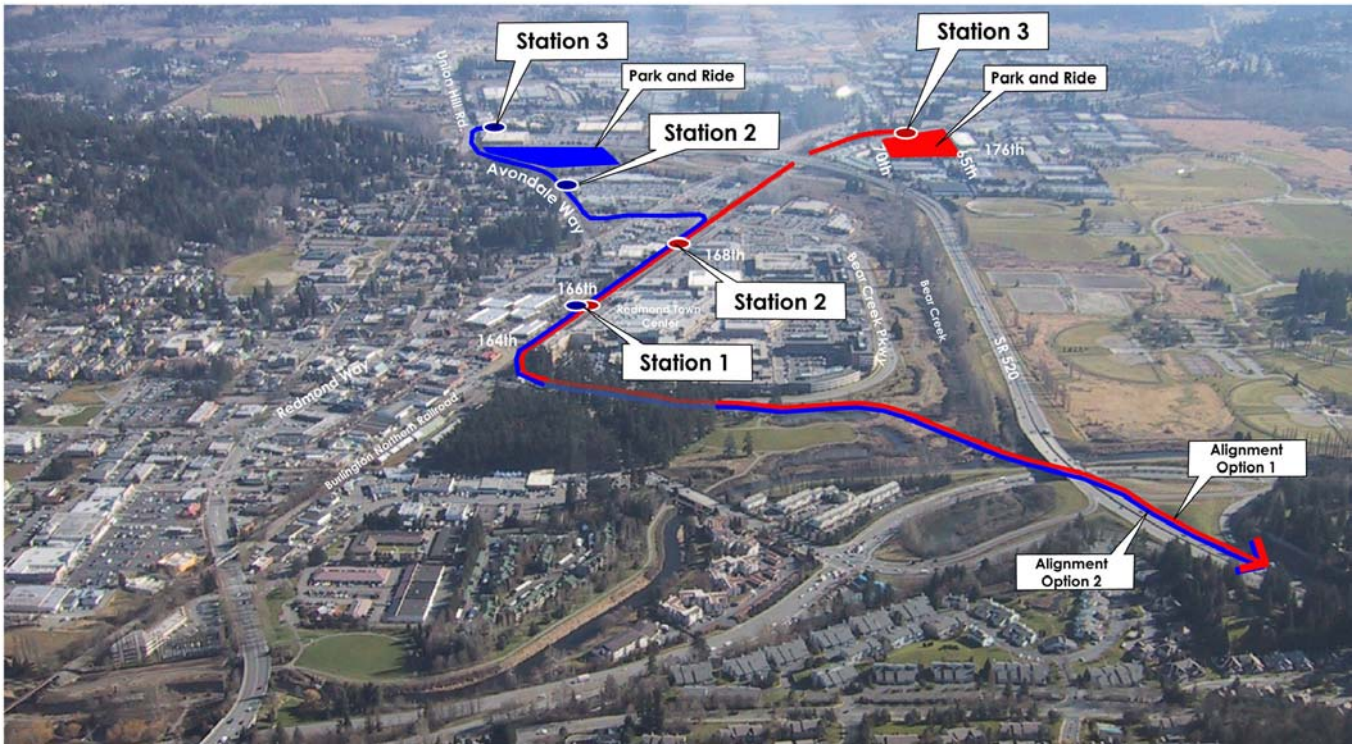
- The alignment would cross wetlands.

The cost would be greater because:

- A large portion of the alignment would need to be elevated over wetlands.

The potential for transit-oriented development was less because:

- Stations had poorer access to existing transit supportive uses such as the Redmond Town Center.
- Fewer redevelopable parcels were available near the stations (137 acres to 159 acres).



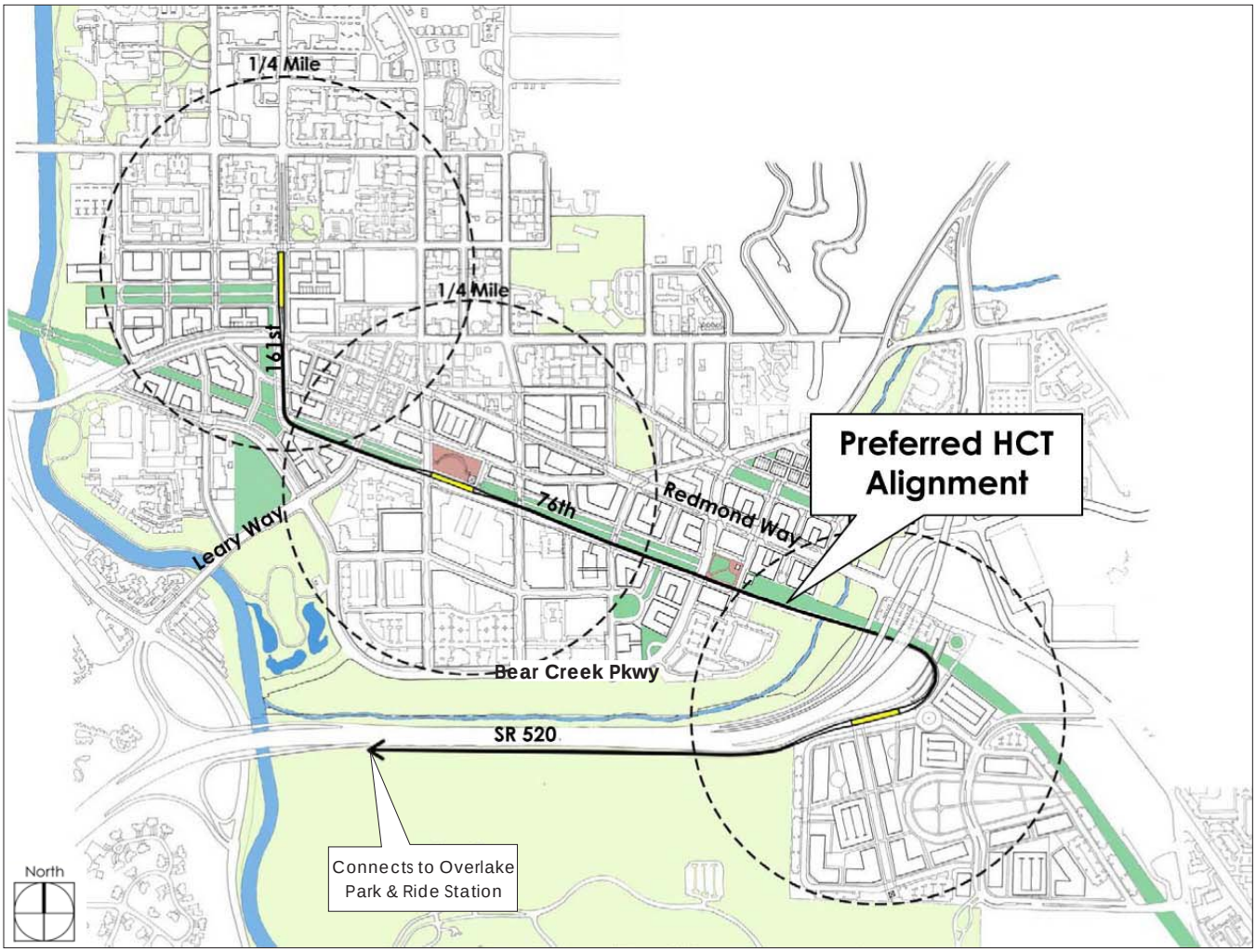
BNSF Alignment

HCT Alignment

The preferred SR 520 out-and-back "boomerang" alignment was selected for the following reasons.

The alignment would:

- Provide for the possibility of future expansion to the north and east.
- Accommodate a double-track facility.
- Be constructed largely within the SR 520, BNSF, NE 76th Street and 161st Avenue NE rights-of-way with a limited number of areas that would need to be acquired for HCT track, park-and-ride facilities and station platform facilities.
- Could generally be constructed at grade with a grade-separated overpass built at the intersection of SR 520 and SR 202.



Preferred SR 520 HCT Alignment

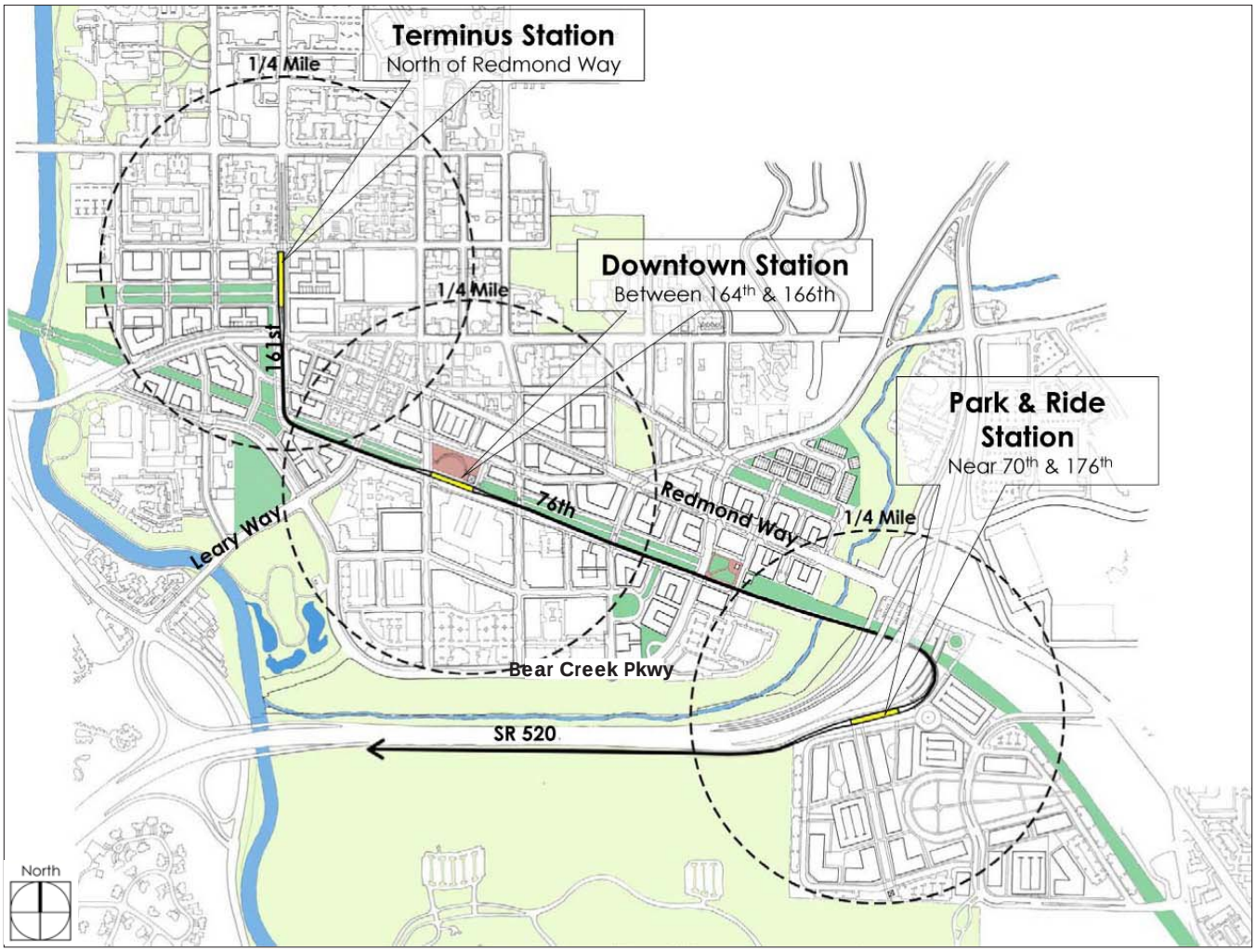
Station Platforms

Three station platforms are suggested. The stations are located to maximize transit ridership. Considerations for station locations include:

- Adjacency to existing residential, employment and retail centers.
- Adjacency to areas that may be redeveloped to accommodate transit-oriented uses.
- Ease of access by pedestrians, cyclists and local transit riders.

Proposed station locations are:

- SE Redmond Station near NE 70th Street.
- Downtown Station between 164th and 166th Avenues NE along the BNSF right-of-way
- Terminus Multimodal Station adjacent to the Downtown Redmond Transit Center and King County Metro's proposed redevelopment of the Downtown Park and Ride as a TOD at 161st Avenue NE and NE 83rd Street.



Preferred HCT Alignment Stations and Platforms

HCT Park and Ride

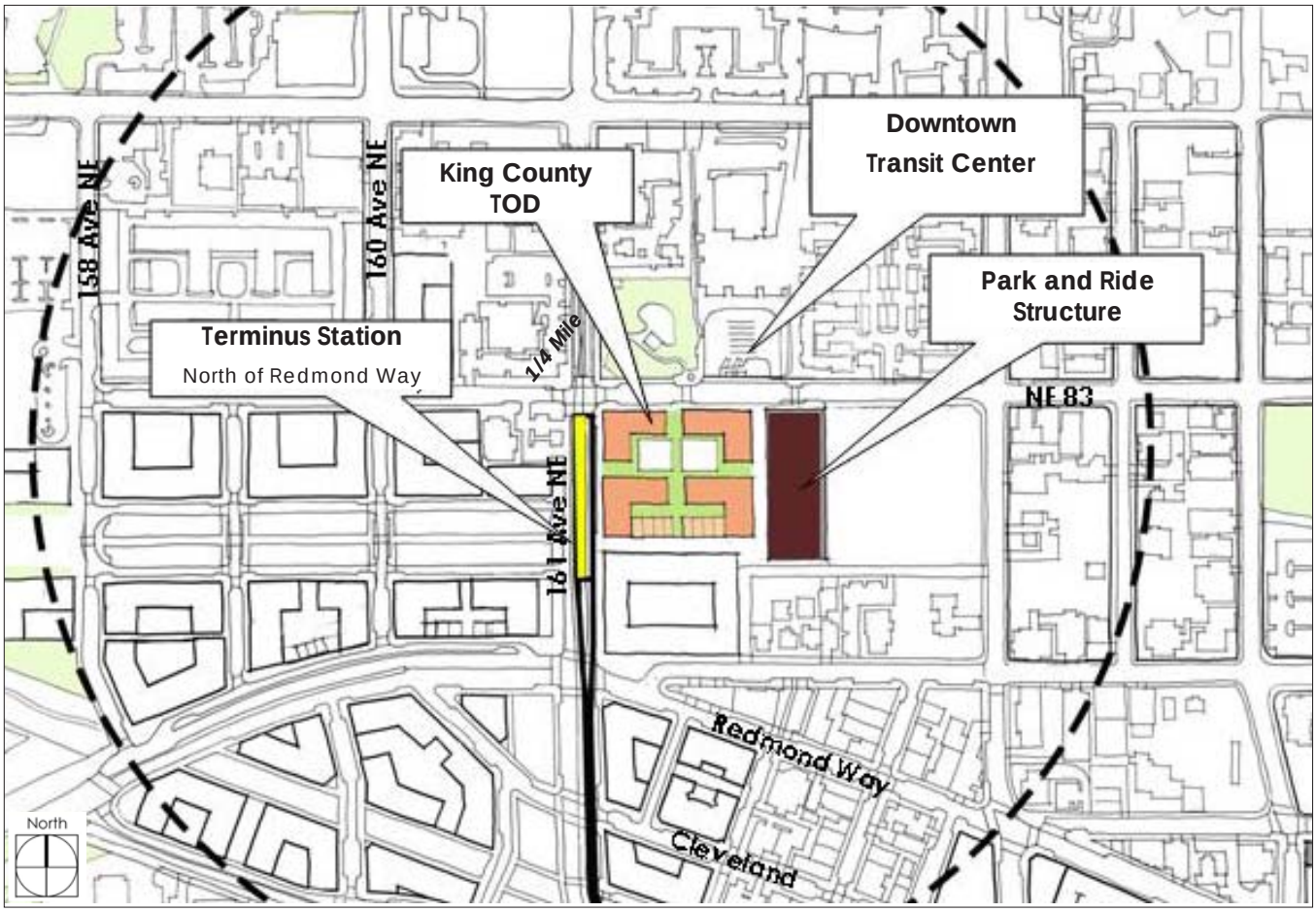
Two park and ride facilities are available for use by HCT patrons. The first site in SE Redmond is easily accessible and visible from Redmond Way/SR 202 and other arterials. It would:

- Accommodate up to 1,000 cars on five levels.
- Have an ideal dimension of 240 ft. by 300 ft. to minimize structure costs and a one-way circulation system to foster ease of vehicle access and ensure pedestrian safety within the garage.
- Provide drop-off facilities adjacent to NE 70th Street.
- Include ground-floor commercial space for convenience uses such as dry cleaners or coffee shops.
- Include overflow surface parking under the SR 520 bridge.

SE Redmond Park & Ride Station Area

Other Park and Ride Facilities

The alignment terminates at NE 83rd Street and 161st Avenue NE adjacent to the future Downtown Redmond Transit Center and Park and Ride.



Terminus Station Park & Ride Area

Transit-Oriented Development

Providing transit service to downtown Redmond will require increasing ridership above and beyond the amount that could be generated by current land uses.

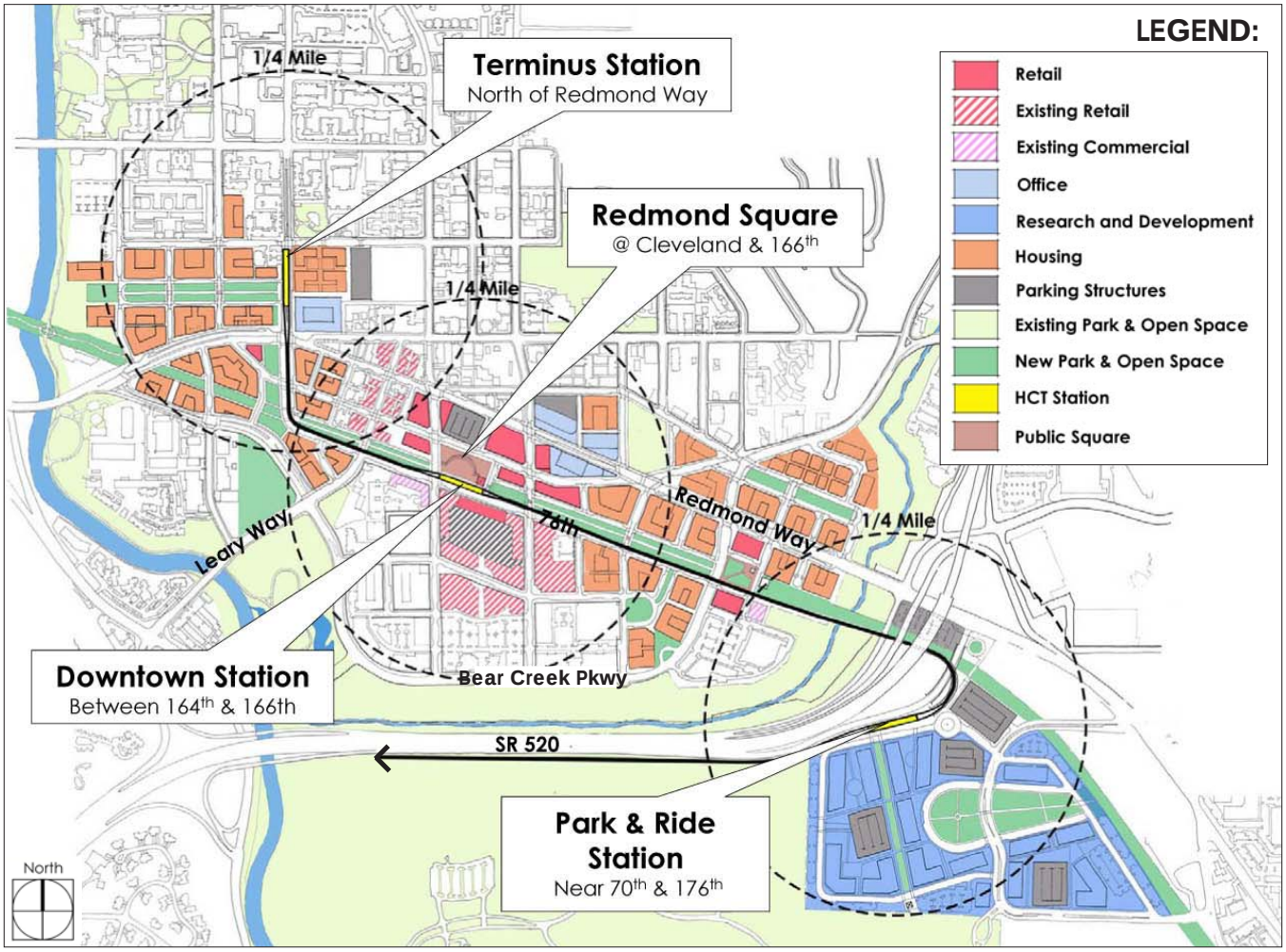
The transit-oriented development framework provides a strategy for development of underutilized parcels coupled with improved access to existing transit-supportive uses that will result in increased transit ridership.

The framework is realistic. It responds to current and future (5 to 7 year) market demand and real estate requirements.

The framework also provides a "future snapshot" of development capacity that illustrates what has been described in the City's Comprehensive Plan and Transportation Master Plans.

New Transit-Oriented Development Capacity Summary At Build-out

▪ New Retail:	176,300 SF
▪ Commercial:	381,675 SF
▪ R&D	1,204,000 SF
▪ Office:	408,000 SF
▪ Housing:	4,683 dwellings
▪ Parking for HCT P & R:	1,300 spaces
▪ Parking for Development	11,573 spaces
▪ Public Open Space	39.92 AC



TOD Capacity Diagram

Cost

A cost analysis for the HCT alignment is included below. Utility conflicts, traffic impacts, right-of-way and travel time are analyzed in comparison to the other alternatives. Relative costs are estimates only and do not represent construction cost. Many assumptions are based on the typical Light Rail Systems.

Redmond HCT Study			**SR 520**
LRT			
Length			13000 feet (2.4 miles)
Utility Conflicts			Good
Traffic Impacts			Good
Row			Good
Travel time from P&R			Good
Cost			Fair
Relative cost			
Civil Construction (sidewalks, lanes, driveways)	$ 100	RF	$ -
Stations-side loading and related improvements	$ 700,000	EA	$ 2,100,000
Elevated track Structure @ $5000 a track foot	$ 5,000	RF	$ 9,000,000
Retaining walls	$ 45	SF	$ 180,000
Ballast track	$ 300	RF	$ 3,900,000
Paved track	$ 650	RF	$ -
Park and Rides			
Utility Allowances			
Low	$ 200	RF	$ 2,600,000
High	$ 400	RF	$ -
Intersections	$ 500,000	EA	$ 1,000,000
OCS	$ 300	RF	$ 3,900,000
Signals	$ 400	RF	$ 5,200,000
Subtotal			$ 27,880,000
E&A	30.00%		$ 8,364,000
			$ 36,244,000
contingency	50.00%		$ 18,122,000
Subtotal			$ 54,366,000
Vehicles Allowance- assume 2 per mile	$ 6,000,000	ea	$ 14,772,000
Total			**$ 69,138,000**

Alignment Alternatives Cost Analysis

Impacts

The preferred SR 520 HCT alignment and associated park and ride facilities would have impacts to public rights-of-way and private parcels within each of the alignment segments at Marymoor Park, SE Redmond and Downtown. The following is a description of those impacts as they relate to a double-track, high-capacity transit alignment and supporting park-and-ride facilities. In addition, impacts to land-use and transportation plans and policies are identified on the following page.

Marymoor Park Segment

This segment is located within the SR 520 right-of-way along the northern boundary of Marymoor Park from the Westlake Sammamish Parkway on the east to the SR 520 off-ramp approach to SR 202 (Redmond Way) on the west. Impacts include:

- Acquisition of Marymoor Park area along the north side of the park.
- Suggested SR 520 lane and/or highway facilities width reductions.

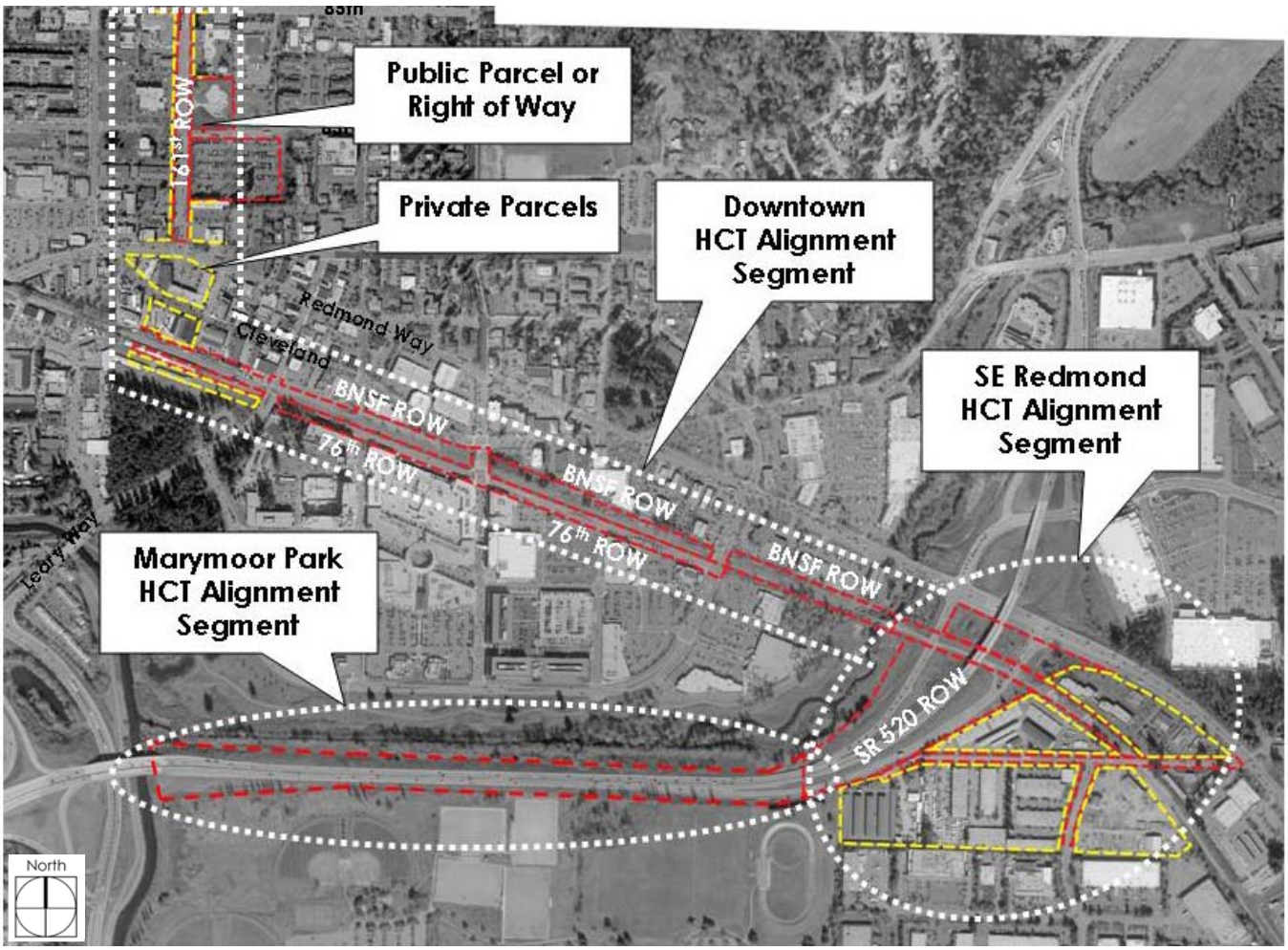
SE Redmond Segment

This alignment is located along the south side of the SR 520 right-of-way in an area bound by Marymoor Park, NE 70th St., Redmond Way and Bear Creek. Impacts include:

- Acquisition of privately owned parcels
- Realignment of SR 520 off-ramp from approach to intersection at SR 202 (Redmond Way)
- Dedicate portion of BNSF right-of-way through the SR 520/SR 202 interchange.

Downtown Segment

- Dedicate portion of BNSF right-of-way from SR 520 to 161st Ave. NE Extension.
- Acquisition of privately owned parcels.



Public and Private Impacted Areas

Ridership

A conceptual analysis of the ridership potential for each of the stations identified potential transit trips per TOD based on the development capacity diagram for each station area, identified below and at right. An analysis of park and ride related high capacity transit (HCT) ridership was also performed for the two station areas that include a park and ride. This is shown on following page.The potential for ridership is as follows:

Station Area Development Ridership

The potential ridership analysis is shown on the right and includes:

- SE Redmond Park & Ride Station 6,531 Trips
- Downtown Station 6,531 Trips
- Terminus Station 3,797 Trips

At build-out, a potential for **16,859 total trips** can be generated by the three study area stations.

SE Redmond - Park & Ride Station

Households and Employment

■ Total Housing (units)	0.00 Units
■ 1, 204,000 (total employment SF) ÷ 43,560 (SF/acre)	27.64 Acres
■ 27.64 (acres) x 95 (employees/acre)	2,625.00 Total Employees

Generated Trips

■ 2,625 (total employees) x 24.88 (trips/day)	65,310.00 Employee Trips/Day
Total	65,310.00 Generated Trips/Day

Transit Trips

■ 65,310.00 (employee trips/day) x 10% (on transit)	**6,531.00 Trips**

Downtown Station

Households and Employment

■ Total Housing (units)	2,436.00 Units
■ 712,600 (total employment SF) ÷ 43,560 (SF/acre)	16.35 Acres
■ 16.35 (acres) x 95 (employees/acre)	1,553.00 Total Employees

Generated Trips

■ 2,436 (housing units) x 10.8 (trips/day)	26,308.00 Housing Trips/Day
■ 1,553 (total employees) x 24.88 (trips/day)	38,638.00 Employee Trips/Day
Total	64,946.00 Generated Trips/Day

Transit Trips

■ 64,946 (total generated trips/day) x 10% (on transit)	**6,494.00 Trips**

Terminus Multimodal Station

Households and Employment

■ Total Housing (units)	2,247.00 Units
■ 253,375 (total employment SF) ÷ 43,560 (SF/acre)	5.81 Acres
■ 5.81 (acres) x 95 (employees/acre)	551.95 Total Employees

Generated Trips

■ 2,247 (housing units) x 10.8 (trips/day)	24,267.00 Housing Trips/Day
■ 551 (total employees) x 24.88 (trips/day)	13,708.00 Employee Trips/Day
Total	37,975.00 Generated Trips/Day

Transit Trips

■ 37,975 (total generated trips/day) x 10% (on transit)	**3,797.00 Trips**

Refined TOD Concept: Potential Ridership

Ridership, cont.

Park and Ride Ridership

A conceptual analysis of park and ride related high capacity transit (HCT) ridership was developed based on a series of assumptions about park and ride facilities and travel behavior.

The potential ridership analysis is shown on the right and includes:

- SE Redmond Park & Ride Station 2,055 Trips (Boardings and Egresses)
- Terminus Station 743 Trips (Boardings and Egresses)

At build-out a potential for **2,798 total trips (boardings and egresses)** can be generated by the park and ride facilities located at the two stations.

Overall Ridership Potential

Based on the build-out potential and park and ride facilities it is estimated that **19,657 trips (boardings and egresses)** can be generated within the station areas.

SE Redmond – Park & Ride Station

Park & Ride Utilization

■ Total Park & Ride Stalls	1000 Stalls
■ Total Daily Vehicles less Vanpool (1,000 stalls x 80% Occupancy x 20% Turnover Rate - 5% Vanpool)	912 vehicles

Generated Transit Boardings

■ Park & Ride (912 vehicles x 1.1 Average Vehicle Occupancy)	1003 Boardings
■ Kiss & Ride (1003 Boardings x 10%)	100 Boardings
■ Transfer from Local Transit*	38 Boardings
Total	1142 Boardings

Total Daily Boardings and Egresses

■ Boardings plus Egresses (1142 Boardings x 2)	2283 Boardings & Egresses
■ 2283 Boardings & Egresses - 10% Bus Transit	2055 Boardings & Egresses

* From 2030 PSRC Model

Terminus Multimodal Station

Park & Ride Utilization

■ Total Park & Ride Stalls	400 Stalls
■ Total Daily Vehicles less Vanpool (400 stalls x 80% Occupancy x 20% Turnover Rate - 5% Vanpool)	365 Vehicles

Generated Transit Boardings

■ Park & Ride (365 vehicles x 1.1 Average Vehicle Occupancy)	401 Boardings
■ Kiss & Ride (401 Boardings x 10%)	40 Boardings
■ Transfer from Local Transit*	130 Boardings
Total	571 Boardings

Total Daily Boardings and Egresses

■ Boardings plus Egresses (571 Boardings x 2)	1143 Boardings & Egresses
■ 1143 Boardings & Egresses - 35% Bus Transit	743 Boardings & Egresses

* From 2030 PSRC Model

Park and Ride: Potential Ridership

Next Steps - Framework Implementation Action Plan

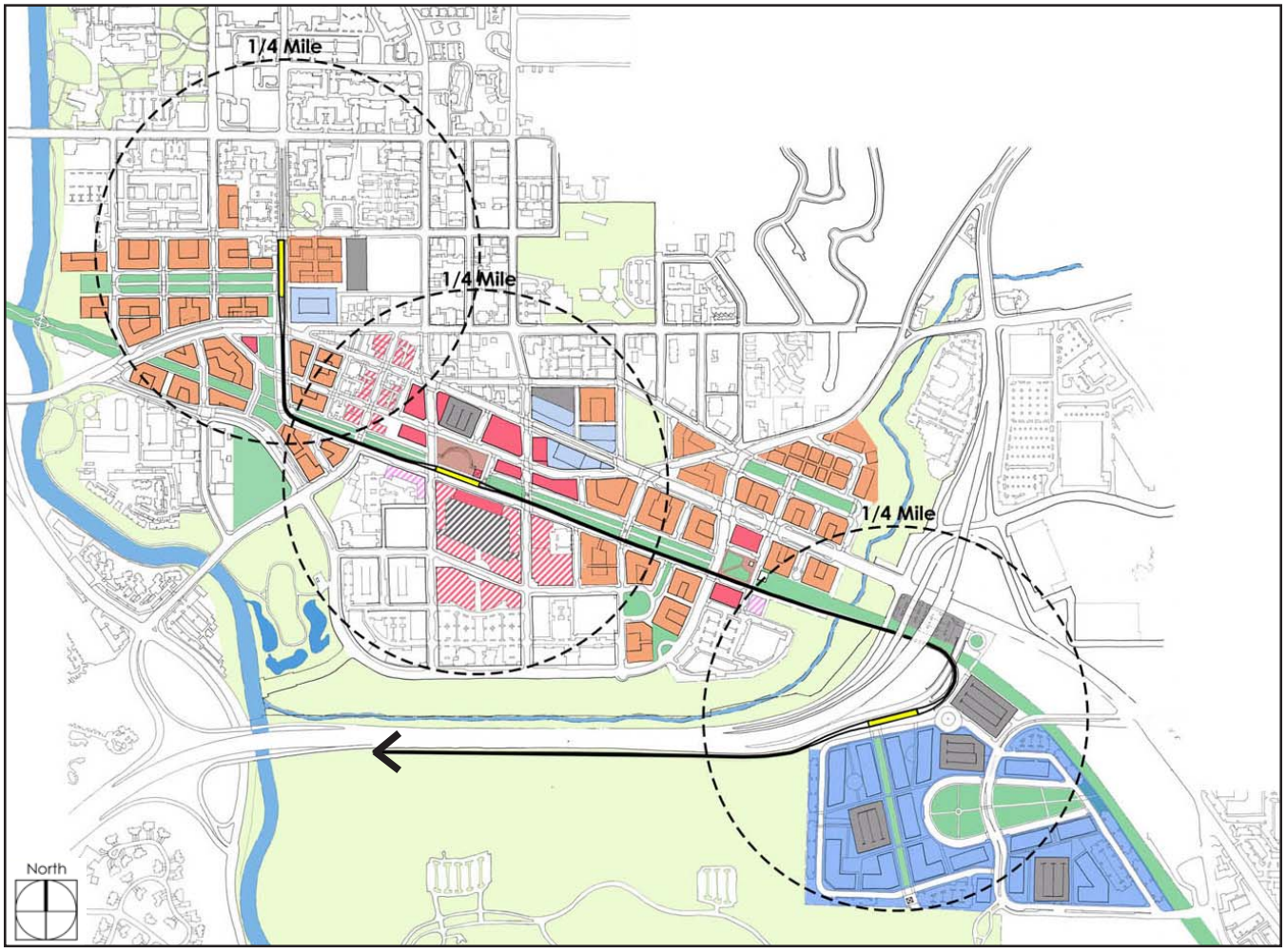
In order to fully implement the recommendations included in this report both the Downtown Element of the Comprehensive Plan and the Transportation Master Plan will need to be updated. This process would include engaging the community in a dialogue about proposed modifications that would better prepare Downtown and Southeast Redmond for future expansion of HCT, as well as housing, employment and retail growth.

Comprehensive Plan Update

The transit-oriented land-use framework is consistent with the vision for development as described in the Comprehensive Plan. However, in order to implement this framework, policies concerning the preferred station location and corridor would need to be refined in the Downtown Element of the Comprehensive Plan.

LEGEND:

- Retail
- Existing Retail
- Existing Commercial
- Office
- Research and Development
- Housing
- Parking Structures
- Existing Park & Open Space
- New Park & Open Space
- HCT Station
- Public Square



Comprehensive Plan Updates Required

Transportation Master Plan Update

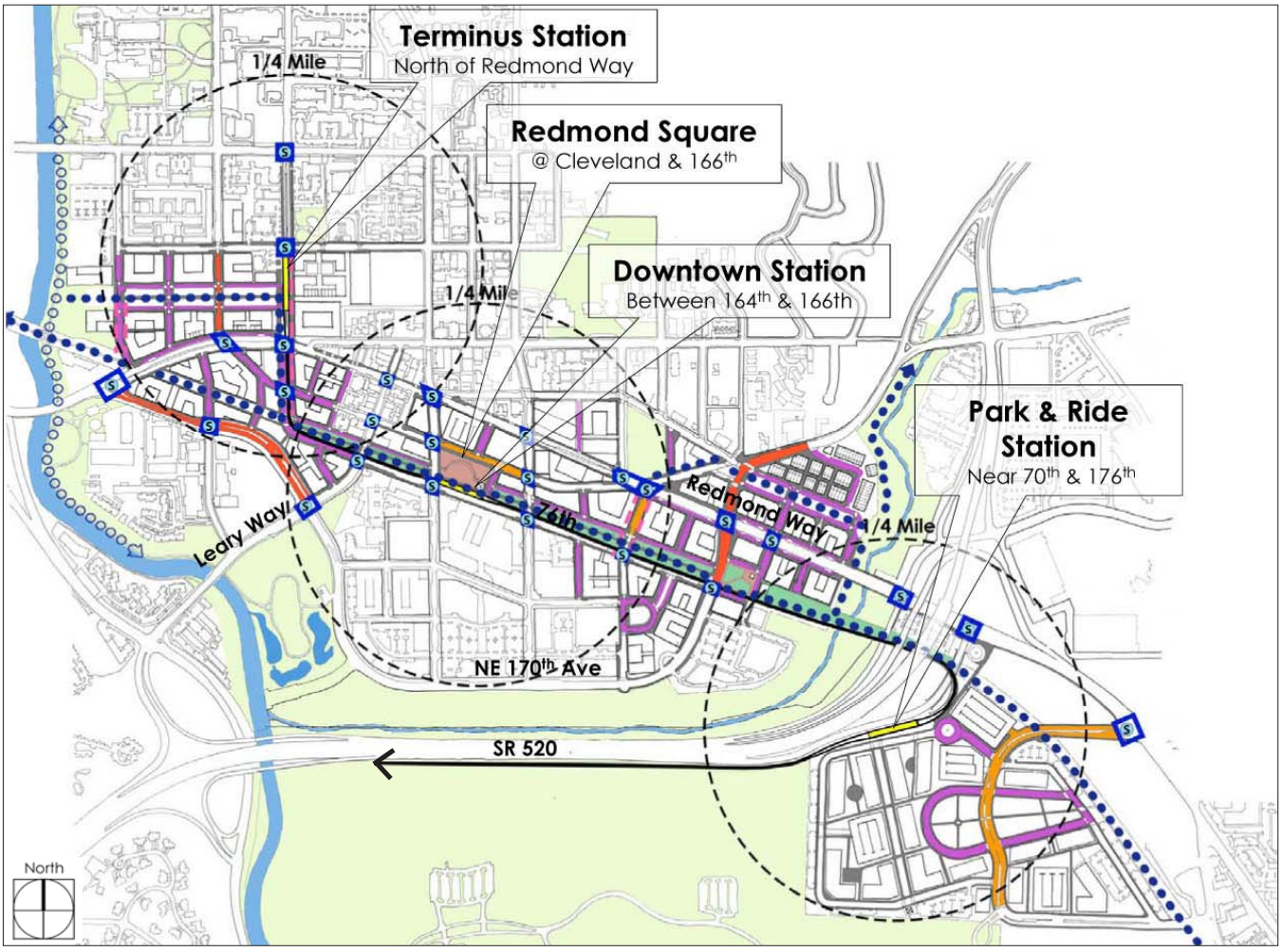
The transit-oriented transportation framework would require changes to the Downtown and Citywide Transportation Master Plans. Modifications to be examined would include:

- New streets for proposed development.
- Realigned existing or planned roads.

(Note: The Bear Creek Parkway concepts shown are not consistent with the Transportation Master Plan. Changes to the Bear Creek Parkway concepts are not anticipated as part of the Transportation Master Plan update)

LEGEND:

- New Roads
- City Proposed Roads
- Realigned Roads
- New Sidewalks
- Signalized Intersections
- Crosswalks
- HCT Stations
- New Open Space along Alignment
- Existing Open Space
- Shared Ped/Bike Path
- Bike Lanes
- Existing/Planned Trail



Transportation Master Plan Updates Required